Vignettes to assess healthcare staff perceptions of risk

Medical devices have become prolific and continue to increase in complexity and diversity, which will inevitably affect risk. The aim of this UK study, conducted by Anthony Brown and with statistical support and guidance from Colin Pritchard, was to investigate the extent to which healthcare professionals’ attitudes and perceptions of risk influence the use of medical devices and the efficacy of error reporting.

Introduction
The UK’s National Health Service (NHS), now in its sixth decade, has seen rapid advances in medical devices used in the diagnosis, therapy and treatment of patients. Recent advances in medical technology have made it difficult for health professionals, including nursing staff and clinicians, to understand and properly operate medical equipment (Hooper et al 1993). The term medical device or equipment is generic, with examples including infusion devices, patient monitors, wheelchairs and surgical instruments. The quantity and complexity of devices continue to increase, which in turn leads to a rise in the potential risk.

One of the most important changes in the NHS from the perspective of risk was the loss of crown immunity in the NHS and Community Care Act 1990. In an increasingly litigious society, greater healthcare resources are being directed towards managing risks. Clinical governance and controls assurance standards commit hospital trusts and primary care trusts (PCTs) to meeting this criterion with the healthcare services they provide (NHS Executive 2001). More recently, in England we have seen Controls assurance being replaced by
the Department of Health’s ‘Standards for Better Health’ (DoH 2004). The current trend favours risk management (proactive) and root cause analysis (reactive) approaches. Root cause analysis is a structured investigation that aims to identify the true cause of a problem, and the actions necessary to eliminate it (Andersen and Fagerhaug 2000). However this only identifies one side of the problem and does not address staff’s perceptions of medical device risk.

To address this shortcoming, a survey was developed to take into account the perceptions of healthcare workers towards medical device risks. The perceptions and attitudes relating to risk could vary across specialties and healthcare worker groups, with some groups more prone to errors and others more likely to make violations. To inform and influence trust-wide risk management strategies, the survey provides a snapshot of the risk perceptions of clinical staff of all grades. This study also attempts to identify whether particular healthcare groups are more likely to make errors and violations because of their lack of risk perception or awareness of risk issues. Latent failures (organisational) are not considered in this survey but are separately researched in a Risk Register Assessment Tool that uses the principles of contributory factors and control measures as identified in the CRU/ALARM protocol (Brown 2004, Vincent et al 1999). Furthermore, this paper provides evidence that demonstrates compliance with several criteria in ‘Standards for Better Health’ that ‘measure’ the management of medical devices.

The survey developed for this study was based a model of human failures (Reason 2001). The underlying principles of this model are based on active failures (unsafe acts) of the individual rather than latent failures in the organisation. These failures will also affect colleagues working as part of a multi-disciplinary team. An adapted flowchart based on the original text is shown for clarity in Figure 1.

The first distinction in active failures is between errors and violations. Errors are sub-divided into mistakes and lapses/execution failures. Mistakes are further divided into rule-based or knowledge-based. Rule-based mistakes are divided into: inappropriate application of a good rule; or application of a bad rule or not applying a good rule. Although not identified in the original model, knowledge affects rule-based mistakes, I perceived. On the
other hand, lapses may include attentional, memory, recognition or selection failures. Again, knowledge can be a factor in both recognition and selection failures.

Violations include: optimising (to alleviate boredom), routine (due to corner cutting) and situated violations (necessary to get the job done). Situated violations may also be a consequence of latent failures in the organisation.

**Method**

A survey was designed to collect a stratified sample across the main healthcare groups that use medical devices in their work.

A number of techniques were considered for this research instrument, including questionnaires and semi-structured interviews. Vignettes are recognised as being particularly useful in the study of potentially difficult topics of enquiry as they can help desensitise aspects for participants to discuss (Hughes and Huby 2002). Vignettes have been used successfully in social science research to investigate attitudes using realistic scenarios (Finch 1987). The
vignette is carefully designed to depict a circumstance or represent a germane issue and to elicit rich but focused responses from informants (Schoenberg and Ravdal 2000). When properly constructed, vignettes are a valid measure of what physicians do during clinical encounters with patients. They not only have a high correlation with practice but also have a capacity to measure the efficiency of clinical care (Peabody et al 2004). The key lies in making the vignette as accurate and realistic as possible and ideally based on experience. They allow features of the context to be specified, which acknowledges that meanings are social and that morality may well be situationally specific. This is essentially a social constructivist approach – ‘meaning making’ – involving a series of relative constructions that are dependant upon the socio-historical setting in which they occur (Lupton 1994, Bruner 1990). They serve the purpose of activating respondents’ imagination and interest. By setting the limits of reference, vignettes provide the same contextual framework to all people participating in the study, and therefore can claim the comparability of their responses (Poulou 2001). No evidence has been found in the literature of vignettes being used in the context of medical device risks.

This study forms part of a much larger research project for which formal LREC ethical permissions were sought. The research project was also registered with the trust’s R&D department to address research governance issues.

The front page of the survey gave instructions to the respondent and provided assurances that ethical and moral issues had been addressed. By completing and returning the survey, the respondent implied consent. The survey is divided into two parts, part one comprising vignettes (short stories) and part two comprising a series of direct questions to assess perceptions of risk. Order effects and counter-balancing have been considered in this research design, with the vignettes being followed by questions – in other words, the proper thing to do then the reality in practice (Bryman 2001, Robson 2002). The three vignettes in this survey are designed to cover a variety of failures that relate to adverse incidents and medical devices. An example of one vignette is shown in Box 1.

Accompanying each vignette was a series of forced-choice Likert statements designed to explore the perceptions of risk and failures (Likert 1932). One of the vignettes also included a red herring to determine whether staff recog-
nised it as a risk or correctly deduced that it does not constitute a potential problem.

The respondents were invited to indicate by ticking the appropriate (forced choice) box to what extent they agreed or disagreed with the statement. There were four choices: strongly agree, agree, disagree and strongly disagree. To gain qualitative data each vignette had one or two statements where respondents were invited to provide free text comments.

In part two of the survey, a series of thirteen questions were posed to gain the respondent’s direct perceptions of risk. The responses for each question were rated from one (low) to five (high).

Once written, the vignettes were passed to a specialist registrar medical doctor and a qualified nursing sister to confirm their clinical accuracy. The vignettes were drawn from the authors’ experiences of medical device risk issues in the clinical setting. I recognise that the two opinions of clinical accuracy are highly subjective and might have been better with wider consultation. However, this is mitigated to some extent by further piloting. I piloted the survey with a small group of 20 respondents. In this group, I observed a representative sample of five respondents individually while they completed the survey. This sub-group consisted of one consultant, a doctor, two qualified nurses and a nursing support worker. Following the pilot, minor modifications were made to the survey; we discuss these fully later in this paper. It is important to recognise the more accurate the vignette is to the situation

Box 1. Sample vignette

In a specialist neonatal unit the doctor prescribed a drug infusion. The nurse searched the ward for a syringe driver but they were all in use. After telephoning several wards a syringe driver was found. It was different than those normally used on the ward but she took pride in her technical ability. Despite there being no instruction booklet she knew that most syringe drivers worked in the same way. The infusion was started and the nurse went off to attend to other duties. When she returned some time later to perform observations she found that the syringe was empty. She felt sure that the syringe should not be empty, but could not remember how much was in the syringe at the start of the infusion. The baby, a six-week-old boy, had deteriorated due to the over-infusion and the nurse raced to find a doctor, knocking her leg on the end of the bed. The baby was left with permanent damage and an incident was declared for the over-infusion. The nurse sustained a small bruise and the syringe driver was returned to the original ward.
being researched the more sensitively and accurately the tool will perform (Schoenberg and Ravdal 2000, Rahman 1996).

The final survey was sent for professional printing to ensure high quality copy: multi-coloured paper was used to improve interest. The research population was identified through the Trust’s workforce records held in a Microsoft Excel spreadsheet. From a research population of 2440, we selected a sample of 953 (40%) to participate, stratified across the four workgroups; we used the random number generation analysis tool in Excel to provide an independent sample in each workgroup. The four workgroups were consultants, other medical doctor grades, qualified nurses and nursing support workers. There was a mix of male and female respondents to guard against gender bias. To improve the anticipated poor response rate from consultants, a supporting letter was attached from the medical director explaining the importance of the study. Each survey was given a unique identifier number and was distributed through the hospital’s postal system to the named respondents.
Results
The completed survey forms were collected and coded using a standard statistical format into SPSS for mathematical modelling and manipulation. The final response figures are shown in Table 1.

Cross tabulation was employed to observe the differences between expected and observed frequencies and hence to make inferences about the variations from the ‘norm’. Pearson’s Chi squared ($\chi^2$) tests for positive and negative associations have formed part of the analysis. A data mapping model (Table 2) was used to analyse the reliability of the survey; it showed a strong correlation between part one (vignettes) and part two (direct questions). Validity is evidenced through its conceptual model basis and thorough piloting.

Discussion
The phrasing of one sentence in a vignette caused major concerns to the nursing sample identified for the pilot. The vignette stated: “Whilst setting up the line the nurse’s mind wandered to the planned social event for the evening, it was going to be a good party”. The nursing staff from one specialist medical ward felt this was a slight on their professional abilities. Interestingly, other nursing staff, including midwives, presented with the same scenario did not raise concern. The wording was subsequently changed to: “Whilst setting up the line the nurse was distracted for personal reasons”.

During the pilot, a sub-group was asked while completing the survey to
comment on ambiguity or problems with the questions. Following the pilot, minor alterations were made to the survey. This clearly demonstrates the importance of piloting and that hidden meanings or perceptions can have a detrimental effect on the effectiveness of a survey.

Despite rigorous testing, one Likert coded statement not flagged up during the pilot stage caused difficulties in the final survey. The statement was: “No alarms sounded and the problems occurred despite the doctor’s attention to the patient’s notes”. While it is acknowledged that there may be some grammatical problems with this sentence, the reason for its failure as a survey question is not apparent. To learn from this, the survey was used as part of a multi-disciplinary research workshop in questionnaire design. Towards the end, the group were asked to read the survey and see if they could spot any parts that would not work. This exercise generated a few comments. However, the offending statement was not identified.

The anticipated poor response rate from consultants was not observed.

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However, a low response rate from the other medics and healthcare support workers necessitated re-surveying.

We hope that the lessons learned from this survey will inform future risk management strategy and awareness training throughout the organisation and may be transferable to organisations with similar structures. In general, we discovered that the degree of risk perception increased with years of service for all groups. Medical staff were less risk averse than nursing staff and the other medic group were the worst offenders. It is also possible to infer links between the degree of accountability in the profession and aversion to risk. Of course, it must be realised that the types of medical devices will differ between the groups. This survey highlights the need for an in-depth look at error reporting. Although healthcare professionals of all grades are aware of the requirements to report incidents and near-misses, when compared with data from the incident reporting system, evidence suggests that there is a degree of under-reporting.

The findings of the survey provide a commentary in support of the trust’s risk management and incident reporting strategies. It provides contributing evidence towards the external assurance framework, including the requisite criteria in the clinical negligence standards and ‘Standards for Better Health’. The statistics imply a need to address the different levels of risk perception and professional judgement across the organisation. Future work will examine errors and violations against the different groups and tease out intra-professional perceptions. We hope this will be explored through risk education provided through a special study unit at the Peninsula Medical School using problem-based learning techniques, so as to develop a heightened awareness of risks early in the career of medical doctors.

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Copies of the survey are available from the authors

This article has been subject to double-blind review


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